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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER	
HO, TU TU V	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/751,710	CHAVARRIA, VICTORIO	
	Examiner	Art Unit	
	Tu-Tu Ho	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *19-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/05/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Oath/Declaration

1. The oath/declaration filed on 01/05/2004 is acceptable.

Election/ Restriction

2. Applicant's election of Invention I, claims 1-18, in the reply filed on 12/21/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

3. Claims 19-22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/21/2004, as noted above.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1-3 and 7-8** are rejected under 35 U.S.C. 102(b) as being anticipated by Ogawa U.S. Patent 5,585,662 (the '662 patent).

The '662 patent discloses in the figures, particularly Figure 5, and respective portions of the specification an apparatus as claimed.

Referring to **claim 1**, the '662 patent discloses an apparatus comprising:

a substrate (11, Fig. 5);

a first layer (12) disposed adjacent the substrate;

a second layer (13) disposed adjacent the first layer;

a third layer (16a,16b) disposed adjacent the second layer, wherein the third layer contains a gap (no number, generally defined by the space between 16a and 16b); and

a fuse (10) disposed between the third layer and the first layer, wherein the fuse is electrically coupled to the third layer, and wherein the fuse is located proximate the gap in the third layer.

Referring to **claim 2**, the '662 patent further discloses that the fuse is a programmable fuse (column 3, lines 45+: "the breakable fuse element 10 forms a part of a program circuit of a redundant unit").

Referring to **claim 3**, the '662 patent further discloses that the fuse is composed of polysilicon doped with phosphorous (column 4, lines 17-20).

Referring to **claim 7**, the '662 patent further discloses that the third layer (16a,b) is composed of aluminum (column 1, lines 42-47, and note that 6a,b is functionally equivalent to 16a,b).

Referring to **claim 8**, the '662 patent further discloses that the fuse provides an electrically conductive path across the gap in the third layer (as is evident from the figure).

5. **Claims 1-2 and 6-8** are rejected under 35 U.S.C. 102(b) as being anticipated by Bezama et al. U.S. Patent 5,585,663 (the '663 patent).

The '663 patent discloses in the figures, particularly Figure 3B, and respective portions of the specification an apparatus as claimed.

Referring to **claim 1**, the '663 patent discloses an apparatus comprising:

a substrate (1, Fig. 3B);

a first layer (2) disposed adjacent the substrate;

a second layer (9) disposed adjacent the first layer;

a third layer (8) disposed adjacent the second layer, wherein the third layer contains a gap (no number, generally defined by the space between the two sections of layer 8); and

a fuse (3) disposed between the third layer and the first layer, wherein the fuse is electrically coupled to the third layer, and wherein the fuse is located proximate the gap in the third layer.

Referring to **claim 2**, the '663 patent further discloses that the fuse is a programmable fuse (as it is used to un-switch a defective circuit through a programmable means, BACKGROUND OF THE INVENTION).

Referring to **claim 6**, the '663 patent further discloses:

a dielectric layer (5) disposed adjacent the third layer; and

a barrier layer (6 or 13, and note that although the reference does not explicitly disclose the barrier properties of the insulating layers 6 or 13, insulating layers 6 or 13 inherently possesses barrier properties to, for example, the elements (the environment)) disposed adjacent the dielectric layer.

Referring to **claim 8**, the '663 patent further discloses that the fuse provides an electrically conductive path across the gap in the third layer (as is evident from the figure).

6. **Claims 1-2 and 9** are rejected under 35 U.S.C. 102(b) as being anticipated by Srikrishnan et al. U.S. Patent 5,469,981 (the '981 patent).

The '981 patent discloses in Figs. 4's and 5's, particularly Fig. 5B, and respective portions of the specification an apparatus as claimed.

Referring to **claim 1**, the '981 patent discloses an apparatus comprising:

a substrate (100);

a first layer (310) disposed adjacent the substrate;

a second layer (350') disposed adjacent the first layer;

a third layer (400') disposed adjacent the second layer, wherein the third layer contains a gap (no number, generally defined by the space between the two sections of the third layer); and

a fuse (390') disposed between (a portion of) the third layer and the first layer, wherein the fuse is electrically coupled to the third layer, and wherein the fuse is located proximate the gap in the third layer.

Referring to **claim 2**, the '981 patent further discloses that the fuse is a programmable fuse (column 1, lines 22+: "use of fuses in electrical circuits for the purpose of selecting a specific circuit").

Referring to **claim 9**, the '981 patent further discloses that electrical conductivity of the fuse can be substantially eliminated by applying a voltage across the fuse for a predetermined time period. (column 5, lines 40-42).

7. **Claims 1 and 2** are rejected under 35 U.S.C. 102(b) as being anticipated by Keller et al. U.S. Patent 5,457,059 (the '059 patent).

The '059 patent discloses in Fig. 1(j) and respective portions of the specification an apparatus as claimed.

Referring to **claim 1**, the '059 patent discloses an apparatus comprising:

a substrate (11);

a first layer (19) disposed adjacent the substrate;

a second layer (20) disposed adjacent the first layer;

a third layer (23, 30, and also referred to as 35, 36) disposed adjacent the second layer, wherein the third layer contains a gap (no number, generally defined by the space between the two sections 35, 36 of the third layer); and

a fuse (22) disposed between the third layer and the first layer, wherein the fuse is electrically coupled to the third layer, and wherein the fuse is located proximate the gap in the third layer.

Referring to **claim 2**, the '059 patent further discloses that the fuse is a programmable fuse (column 1, lines 6-14).

8. **Claims 10, 12, and 14** are rejected under 35 U.S.C. 102(b) as being anticipated by Nathan et al. U.S. Patent 5,813,881 (the '881 patent).

The '881 patent discloses in Figures 4's and respective portions of the specification an apparatus as claimed.

Referring to **claim 10**, the '881 patent discloses an apparatus comprising:

a substrate (31);

a thermal isolation layer (38, and note that although the reference does not explicitly disclose that plastic resin 38 (column 17, lines 22-23) is a thermal isolation layer, plastic resin 38 inherently possesses thermal isolation property) disposed adjacent the substrate;

a first dielectric layer (38A) disposed adjacent the thermal isolation layer;

a metal layer (33A,34A, column 17, lines 25-27) disposed adjacent the first dielectric layer;

a fuse (37A, column 17, lines 25-27) disposed in the first dielectric layer (38A) and electrically coupled to the metal layer;

a second dielectric layer (31A) disposed adjacent the metal layer; and

a barrier layer(31B, and note that although the reference does not explicitly disclose the barrier properties of the insulating layer 31B, insulating layer 31B inherently possesses barrier properties to, for example, the elements (the environment))) disposed adjacent the second dielectric layer (31A). Note also that "adjacent" is interpreted broadly, similarly to claim 1 of

the present invention where the second layer (212 or 214, for example) is adjacent the first layer (216 or 214), the third layer (208) is *adjacent* the second layer (212 or 214), and yet the fuse (210) is formed between the third layer and the first layer.

Referring to **claim 12**, the '881 patent further discloses that the metal layer contains a gap proximate the fuse and wherein the fuse provides an electrically conductive path across the gap (as is evident from Fig. 4A).

Referring to **claim 14**, although the '881 patent does not explicitly discloses that the barrier layer prevents fluid from contacting the second dielectric layer, the barrier layer 31B, formed of an insulating material inherently prevents fluid from contacting the second dielectric layer (31A), which is below the barrier layer.

9. **Claims 10, 12-14, 16, and 18** are rejected under 35 U.S.C. 102(e) as being anticipated by Baek U.S. Patent Application Publication 2004/0085405 (the '405 publication).

Referring to **claim 10**, the '405 publication discloses an apparatus comprising:

a substrate (200, Figs. 3 or 8);

a thermal isolation layer (not shown. Note that although the reference does not explicitly disclose a thermal isolation layer, a thermal isolation layer is inherent. Specifically, the reference discloses in paragraphs [0049] and [0050] that a MOSFET – and thus all the required inter-layer insulating layers and element isolation regions – see, for example, Fig. 1(j) of the '059 patent which is cited above - - is formed *in* the substrate, an insulating layer is then formed *on* the MOSFET, and the electrode 202 – the equivalent of the metal layer of the claim - is in turn formed *on* the insulating layer; and it shall be apparent that at least each of these required inter-

layer insulating layers, the element isolation region – designated as LOCOS Oxide in the mentioned Fig. 1(j) – and the insulating layer on the MOSFET inherently possesses thermal isolation property) disposed adjacent the substrate;

a first dielectric layer (208) disposed adjacent the thermal isolation layer;

a metal layer (202, paragraph [0050], lines 1-4) disposed adjacent the first dielectric layer;

a fuse (206, paragraph [0052], lines 1-2) disposed in the first dielectric layer (208) and electrically coupled to the metal layer;

a second dielectric layer (one of the mentioned required inter-layer insulating layers, the element isolation region, and the insulating layer on the MOSFET) disposed adjacent the metal layer; and

a barrier layer(210', paragraph [0063]) disposed adjacent the second dielectric layer (210' or 220).

Note that "adjacent" is interpreted broadly, similarly to claim 1 of the present invention where the second layer (212 or 214, for example) is adjacent the first layer (216 or 214), the third layer (208) is *adjacent* the second layer (212 or 214), and yet the fuse (210) is formed between the third layer and the first layer.

Referring to **claim 12**, the '405 publication further discloses that the metal layer contains a gap proximate the fuse and wherein the fuse provides an electrically conductive path across the gap (as is evident from the mentioned figures).

Referring to **claim 13**, the '405 publication further discloses that the (inherent) second dielectric layer (the mentioned required inter-layer insulating layers, the element isolation region,

and the insulating layer on the MOSFET) includes a layer of a first dielectric material and a layer of a second dielectric material.

Referring to **claim 14**, although the '405 publication does not explicitly discloses that the barrier layer 210' prevents fluid from contacting the second dielectric layer, the barrier layer is being disclosed as preventing fluid from contacting the fuse member 206 and the electrode 202 (paragraph [0063]), and thus the barrier layer inherently prevents fluid from contacting the second dielectric layer as well, as they are all in a proximate area.

Referring to **claim 16**, the '405 publication further discloses that the fuse is a programmable fuse (paragraphs [0013] to [0016]) composed of tantalum aluminum (TaAl, paragraph [0052])

Referring to **claim 18**, the '405 publication further discloses that the metal layer is composed of aluminum (paragraph [0050], lines 1-4).

Claim Rejections § 102 & § 103

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. **Claims 10-14** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the '663 patent.

Referring to **claim 10**, the '663 patent discloses an apparatus comprising:

a substrate (1, Fig. 3B);

a thermal isolation layer (2, and note that although the reference does not explicitly disclose that silicon dioxide layer 2 is a thermal isolation layer, silicon dioxide layer 2 inherently possesses thermal isolation property) disposed adjacent the substrate;

a first dielectric layer (9) disposed adjacent the thermal isolation layer;

a conductive layer (8) disposed adjacent the first dielectric layer;

a fuse (3) disposed in the first dielectric layer (9) and electrically coupled to the conductive layer;

a second dielectric layer (5/6 or 6/9 – and the use of double layers shall be apparent for claim 13) disposed adjacent the conductive layer; and

a barrier layer(13, as detailed above for claim 6) disposed adjacent the second dielectric layer.

However, the reference fails to teach that the conductive layer is a metal layer as claimed. Nevertheless, inter-layer conductive layers, as in this case for conductive layer 8, for semiconductor integrated circuit are normally metal, which gives rise to the term inter-layer metallization. Conductive layer 8 could be a non-metal conductive, however, it would be practical to use metal instead of non-metal for a conductive as it is what one of ordinary skill in the art would use.

Referring to **claim 11**, the '663 patent further discloses that the metal layer (8) contains a gap proximate the fuse (3) and wherein the gap is filled with material from the second dielectric layer (5, and note that although part of dielectric layer 9 is between the bottom of the gap and the second dielectric layer 5, the gap is nonetheless proximate, as in "very near", the fuse and the

gap is nonetheless filled with material from the second dielectric layer; or alternately, the metal layer (8) contains a gap proximate the fuse (3) and wherein the gap is filled with material from the second dielectric layer 6/9).

Referring to **claim 12**, the '663 patent further discloses that the metal layer contains a gap proximate the fuse and wherein the fuse provides an electrically conductive path across the gap (as is evident from Fig. 3B).

Referring to **claim 13**, the '663 patent further discloses that the second dielectric layer (5/6) includes a layer of a first dielectric material (5) and a layer of a second dielectric material (6).

Referring to **claim 14**, although the '663 patent does not explicitly discloses that the barrier layer prevents fluid from contacting the second dielectric layer, the barrier layer 13, formed of an insulating material such as polyimide (column 4, lines 36-38) inherently prevents fluid from contacting the second dielectric layer (5/6), which is directly below the barrier layer 13.

Claim Rejections - 35 USC § 103

11. **Claims 4-5** are rejected under 35 U.S.C. §103(a) as being unpatentable over the '662 patent.

The '662 patent discloses an apparatus as claimed and as detailed above for claim 1 including fuse 10 formed of polysilicon as claimed in claim 3, also as noted above. The reference further discloses that fuse 10 may be formed of a metal such as tungsten or molybdenum (column 4, lines 20-23). However, the '662 patent fails to disclose exactly the

claimed materials of tantalum aluminum (claim 4) and WSiN (claim 5). Nevertheless, since the claimed materials and the disclosed materials are all conductive materials, available to one of ordinary skill in the art, and are suitable for fuses, the change from one to another would have been within the skill of one of ordinary skill in the art at the time the invention was made and therefore would have been obvious.

12. **Claims 15 and 17** are rejected under 35 U.S.C. §103(a) as being unpatentable over the '405 publication.

The '405 publication discloses an apparatus as claimed and as detailed above for claim 10 including programmable fuse 206 formed of tantalum aluminum (TaAl) as claimed in claim 16, also as noted above. The reference further discloses that fuse 206 may be formed of other materials such as Ti, TiN, Ta,... (paragraph [0052]). However, the '405 publication fails to disclose exactly the claimed materials of doped polysilicon (claim 15) and WSiN (claim 17). Nevertheless, since the claimed materials and the disclosed materials are all conductive materials, available to one of ordinary skill in the art, and are suitable for fuses, the change from one to another would have been within the skill of one of ordinary skill in the art at the time the invention was made and therefore would have been obvious.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu-Tu Ho
January 05, 2005

David Nelms
Supervisory Patent Examiner
Technology Center 2800